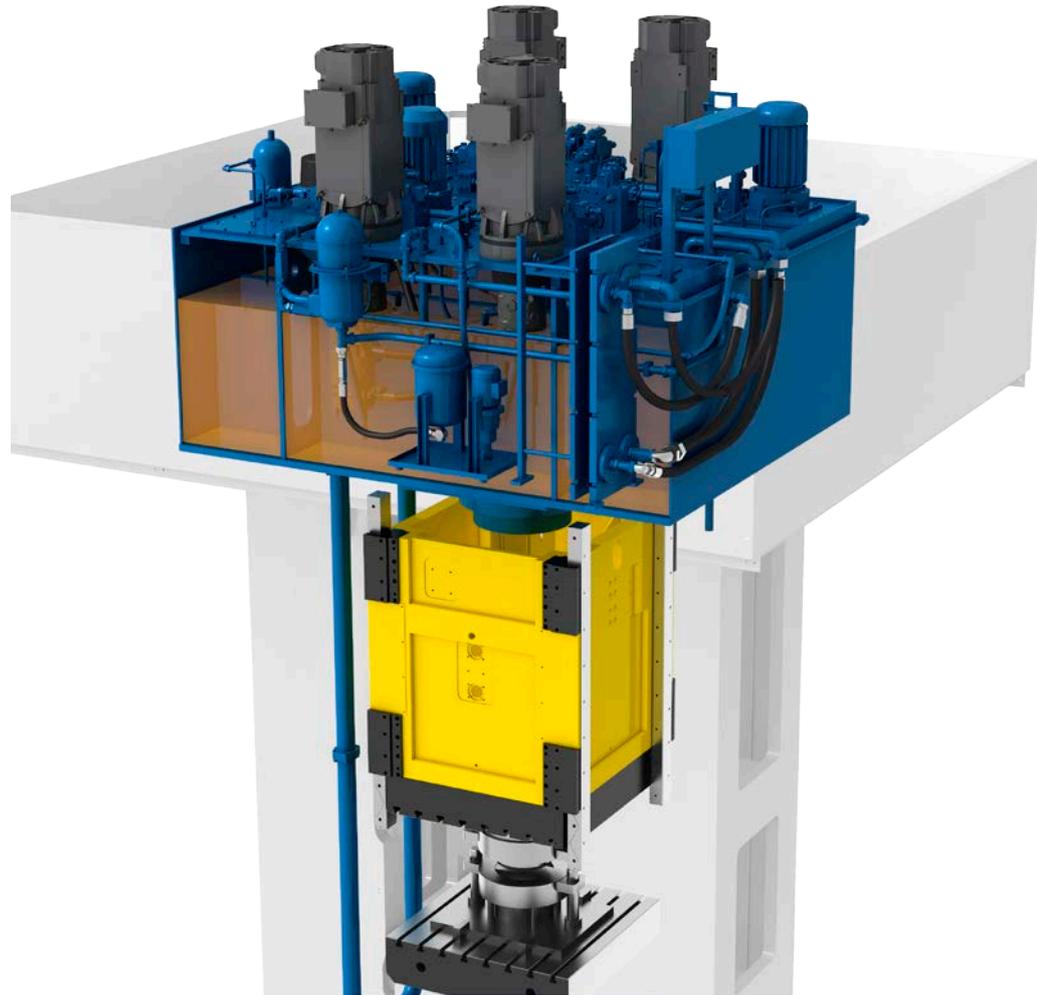


Special info

## Hydraulic servo direct drive



**LASCO UMFORMTECHNIK**  
**WERKZEUGMASCHINENFABRIK**



## Concept for energy-efficient hydraulic presses

### The servo drive technology is capturing the hydraulic presses.

At a hydraulic servo direct drive a servo motor is directly coupled with a hydraulic pump. The positioning of the hydraulic pistons, the adjustment of the pressing speed as well as the setting of force values are done without control or proportional valves.

The availability of efficient electric servo drives is giving this drive concept more and more momentum.

Contrary to this concept the conventional press drive is normally effected via an asynchronous motor running at constant speed and a pump with variable delivery rate that can be adjusted

mechanically, and it is controlled by control or proportional valves.

But still the new technology cannot do completely without valves. Valves that can be switched and partly also controlled are required for safety functions or the filling of large cylinder chambers for quick movements. In addition the safeguarding of the pressure circuits against a maximum value must also be maintained.

This drive technology shows its strengths especially in positioning tasks. The value of the actual position for the press ram is transferred to the position controller of the axis control. Then the servo drive moves the hydraulic piston to its desired position by feeding the required quantity of hydraulic oil into the cylinder. In addition compressibility and leakages are

compensated automatically. For machines with several press cylinders a simple and highly efficient synchronization control can be realised even with changing loads.

Press area and draw-back area are provided with hydraulic oil by separate pump drives. During the fast down-movement of the press ram the hydraulic oil flows from the draw-back area via a pump into the oil reservoir. The speed is controlled by the servo motor, electric power is stored in the intermediate circuit of the servo system during the generator operation of the servo motor. The braking function is also effected by the servo motor. For the subsequent pressing function the motors take braking energy from the intermediate circuit of the servo system that has been fed in before.

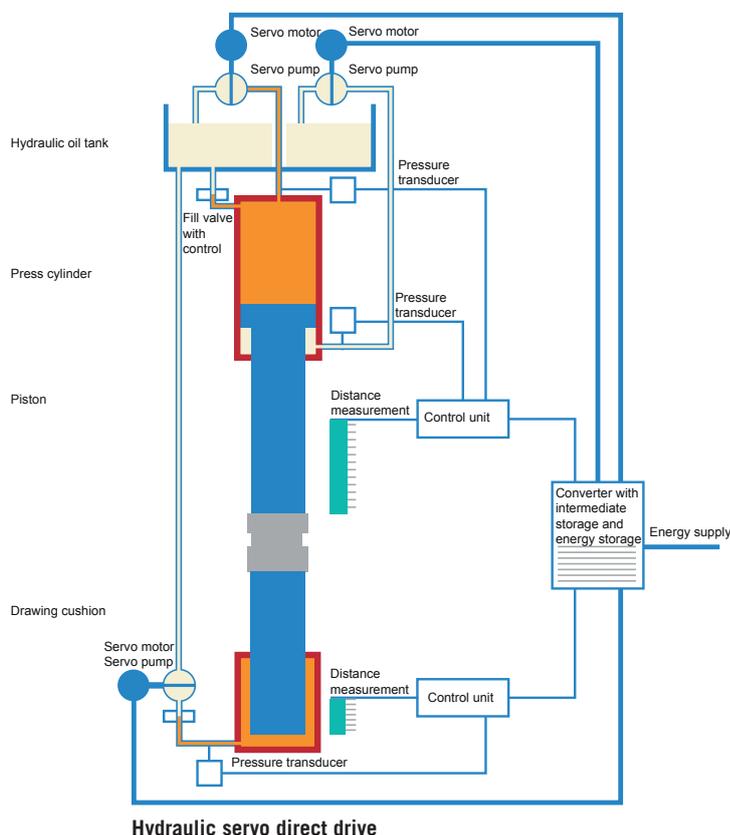
The spring energy that is stored in the compressed hydraulic oil at the end of the press cycle is also used for driving pump and servo motors in the relief cycle generatively storing energy in the intermediate circuit.

Both internal gear pumps and axial piston pumps can be used for the drive of the servo hydraulic press.

Due to the scalability of the drives (number of the motor/pump combinations) almost any driving power can be realised.

### Drawing cushion with servo drive technology

Servo technology allows almost perfect control not only of the main press cylinders but also ejectors and drawing cushions. In the displacement operation of the drawing cushion the servo motor counteracts with its flanged pump. The drawing pressure is determined by the torque of the servo motor in generator operation. The generated energy part-



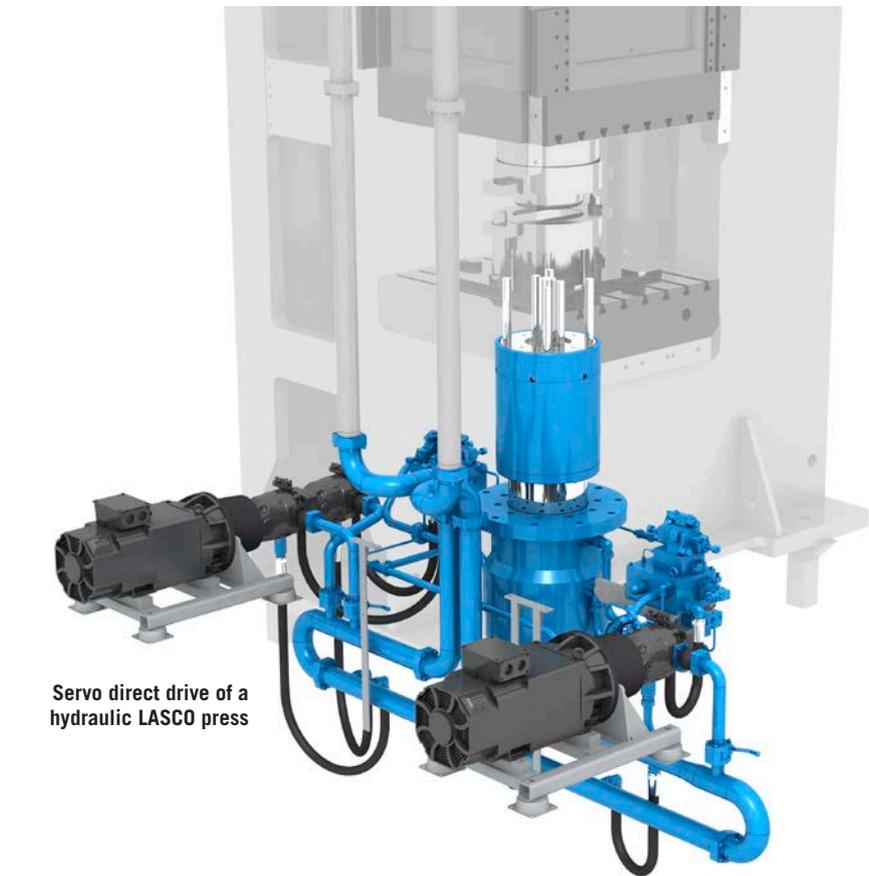
## Benefits

ly feeds the drives of the drawing punch, thus leading to an immense increase in efficiency.

Even the control oil pressure circuits are fed via a servo pump. Here the servo motor is operated by torque regulation to maintain the required control pressure. The pump is then rotated exactly at the rotational speed required to supply the quantity of control oil plus leakage.

Such hydraulic systems have an uncomplicated design and allow very quick and simple diagnosis. The function of an automatic pump check allows to check the hydraulic pumps for wear at regular intervals.

The servo direct drive can be optimally adapted to the requested forming task. Extrusion or drawing operations require nearly constant pressing force over a long distance. In this case power control operation is abandoned. Upsetting or even stamping is characterized by a non-linear force path with a short, steep force increase at the end. Here power control operation



Servo direct drive of a hydraulic LASC0 press

suggests itself to limit the motor torque. This can be done with a pump with adjustable delivery. The pump is adjusted down during

the force increase towards the end of the pressing cycle to limit the required torque. Thus lower forces still allow relatively high speed.

## The advantages at a glance

- Hydraulic presses with servo pump drives have a coefficient of efficiency of  $> 90\%$  ( $\cos \phi = 1$ ).
- During a standstill of the line drive motors and pumps also stop.
- The operation of the hydraulic system is almost pulsation-free.
- Multi-axial lines – especially with tight functional connections of the axes – can be controlled reliably.
- All setting data allow digitized storage and documentation.
- Simplified diagnosis even of complex line structures due to clear drive design.

## **www.lasco.com**

Headquarters:  
LASCO Umformtechnik GmbH  
Hahnweg 139  
96450 COBURG  
GERMANY  
Phone +49 9561 642-0  
Fax +49 9561 642-333  
E-mail [lasco@lasco.de](mailto:lasco@lasco.de)  
Internet [www.lasco.com](http://www.lasco.com)

LASCO FRANCE  
1, allée des Cèdres  
78860 SAINT NOM LA BRETÈCHE  
FRANCE  
Phone +33 1 3080-0528  
Fax +33 1 3080-0584  
E-mail [thierry.lebailly@lasco.de](mailto:thierry.lebailly@lasco.de)

LASCO USA  
LASCO Engineering Services L.L.C.  
615 Harbor Avenue  
MONROE, MI 48162  
USA  
Phone +1 734 241-0094  
Fax +1 734 241-1316  
E-mail [lasco@lascoUSA.com](mailto:lasco@lascoUSA.com)  
Internet [www.lascoUSA.com](http://www.lascoUSA.com)

LASCO CHINA  
LASCO (Beijing) Forming Technology Co. Ltd.  
Huateng Tower, Unit 1706A  
Jia 302, 3rd Area of Jinsong,  
Chaoyang District  
100021 BEIJING  
P.R. CHINA  
Phone +86 10 8773 0378  
Fax +86 10 8773 0379  
E-mail [lasco.beijing@lasco.de](mailto:lasco.beijing@lasco.de)